

DUP.
R. M. T.

Padgard

SOME POINTS IN REGARD TO THE
DIAGNOSIS AND TREATMENT
OF HEART DISEASE.

850

LIBRARY.
SURGEON GENERAL'S OFFICE

JUN 29 1910

BY FREDERICK A. PACKARD, M.D.,
Philadelphia.

READ BEFORE THE LEBANON COUNTY (PA.)
MEDICAL SOCIETY.

BALTIMORE:
MARYLAND MEDICAL JOURNAL.
1898.

SOME POINTS IN REGARD TO THE DIAGNOSIS AND TREATMENT OF HEART DISEASE.

THE subject of the diagnosis and treatment of heart disease is so large and so important, and so many points are worthy of prolonged discussion, that it would be impossible to condense into one paper of reasonable length more than a few points in regard to it. In what follows, therefore, merely some thoughts and opinions in relation to the diagnosis and treatment of diseases of the heart will be alluded to, much of the ground being either entirely ignored or briefly mentioned.

In connection with both the diagnosis and treatment of cardiac disease there are two considerations concerning the physiology of the circulation which are important and to which, to my mind, too little attention is paid. It is certain that in many discussions upon cardiac therapeutics and diagnosis pathological anatomy is too prominently considered at the expense of pathological physiology. A much broader view of cardiac disease is obtained if we do not look too closely at the heart itself as the sole portion of the body affected, but simply look upon that

organ as an important part of the circulatory system.

It is to be remembered that in the human embryo in the early stages of its existence the heart consists (after the fusion of the two primary cardiac rudiments) of a simple tube in direct communication with an afferent and efferent vessel. By further development and by the formations of various folds in this tube, and by its division into separate chambers by septa, this simple tubular heart becomes the wonderful central organ of the circulation as seen in post-natal life. While the analogy between the human heart in its various stages of embryonal development and the heart of ascending series of lower animals cannot be strictly drawn, there is some resemblance that partly justified the attempt to establish such a parallel.

In the amphioxus the vascular system is composed of a simple uniform pulsatile tube, supplying branches to all parts of the body. In studying this system in progressively higher orders of animals it is found that the heart becomes more and more differentiated as a separate and specialized portion thereof, until finally the mammalian heart, with its beautiful mechanism, is reached. By bearing this view in mind we obtain a much broader idea of the functions and derangements

of the heart and the results of disease therein, while it can readily be seen how much more importance should be attached to the peripheral portions of the circulatory apparatus than is ordinarily allowed to it.

As with other specialized portions of various parts of the body, which, by their specialization come under the category of organs, we find that this specialized organ of the circulation is provided with nerves and nervous centers having actions analogous to but more highly developed than belong to those of the less specialized but still very important parts of the same system.

Another factor in the physiology of the circulation is one of no mean importance. The muscles, which form so large a portion of the bulk of the body, may be looked upon not only as means for movement of the various portions of the body, but also as a vast system of small pumps for the propulsion of blood and lymph. The muscles are freely supplied by arteries; their lymphatic spaces and vessels have in the aggregate an enormous volume, and the onward propulsion of blood in the venous channels depends to a very large measure upon the contraction of the muscles, from which innumerable veins proceed and in the neighborhood of which the large venous trunks are placed.

Action of a muscle invites the flowing of arterial blood into its substance from the increase of vital activity, while contraction of the fibers separately and as a whole empties the lymphatic spaces surrounding and penetrating the muscle fibers and bundles, and accelerates the exit of venous blood from the muscle capillaries into the venous radicles and from them into the venous trunks, while contraction of the muscles of a part would seem to likewise force upward the stream of blood in the larger venous trunks. The muscular masses of the body can, therefore, be looked upon as, so to speak, a widely spread-out system of minute pumps interposed between a large portion of the arterial and venous blood-vessels. When we consider the relatively enormous extent of the skeletal muscular system and the great amount of blood (estimated at one-fourth of the total weight) contained therein, it can be conceived that its total pumping action is no mean factor in the propulsion of the blood. Aside from this influence upon the circulation of blood, the effect of muscular contraction upon the lymph-stream is one that cannot be ignored.

The physical signs produced by various lesions of the orifices of the heart can furnish much information in regard to the physical condition of the cardiac

muscle and of the entrances to and exits from the various chambers of the organ, and also can determine for us within reasonable limits the actual size of the heart as a whole; but in so far as treatment is concerned it is far more important for us to determine the manner in which the heart is performing its functions than to be able to state exactly the morbid anatomical condition present.

To illustrate my meaning I would take the following examples: A heart may be seriously altered from the normal by the presence of obstruction at the mitral orifice as evidenced by the presence of a presystolic murmur heard in the neighborhood of the apex, while by an extension of the area of cardiac dullness to the right we might positively assert the existence of cardiac enlargement. In such a case as this the patient may require no treatment whatever, or may need our most active interference. What determines us in our line of action? By physical examination of the heart alone we cannot state the extent of the mitral lesion or the character of the enlargement. In order to decide as to the extent of the lesion and as to whether the enlargement is due to hypertrophy, or to dilatation, or to a combination of the two, and in order to determine to what extent the heart is capable of performing its work,

we have to consider the condition of other parts of the body.

Again, without the presence of a cardiac murmur the heart may be found, upon physical examination, to be decidedly larger than in health. To determine whether this enlargement is due to hypertrophy, to dilatation or to a combined dilatation and hypertrophy we can only depend upon the manner in which the work of the heart is being performed. A third example is furnished by the by no means rare cases where percussion shows a normal area of cardiac dullness, and where auscultation reveals no sign of valvular lesion, and yet such a patient may be the subject of serious symptoms referable to the heart. It is seen, therefore, how limited is the scope of knowledge gained by physical examination of the precordium as compared with the data regarding ultimate diagnosis of the physiological power of the heart and, consequently, of the line of treatment to be adopted.

By what I have said above in regard to physical diagnosis I do not wish to be considered as in any way depreciating the value of this means of investigation and this factor in determining our line of treatment. I merely wish to call attention to the great value of other signs and symptoms in aiding us to a proper estimation of the conditions present.

One of the most difficult points to positively determine in examining the heart is the correct interpretation of the meaning of the murmur in certain cases of anemia. For example, in acute articular rheumatism we have a disease which is capable of producing a profound and rapid anemia, sufficient in itself to cause hemic murmurs, while, at the same time, one of its most marked tendencies is the production of endocarditis. Again, in progressive pernicious anemia the hemic murmurs are extremely frequent, almost constant, while, owing to the degenerative changes produced in the heart muscle, dilatation of the heart, with commensurate dilatation of the auriculo-ventricular orifice, may occur.

Accentuation of the second sound at the pulmonary area, which is of much value in estimating the extent of mitral disease, is unfortunately of little value in eliminating anemia as a cause of the murmur, inasmuch as the same loudness of this sound is found in many cases of severe anemia.

In a case now under my care there is a clear history of rheumatism, with cardiac involvement, occurring four years ago. The patient came to my office one day panting for breath and her whole frame shaken by her cardiac pulsations. The skin and mucous membranes were absolutely white and there was a loud

systolic blowing murmur to be heard over the whole precordium, but most intensely at the apex and at the second right intercostal space. From the apex the murmur was well transmitted to the left axilla and scapular angle; the portion heard most loudly at the aortic area was poorly transmitted, and over the carotids it was impossible to hear it owing to the presence of a loud, whirring venous hum. In this case there is no doubt as to the existence of mitral regurgitation; there is probably also aortic obstruction, but I say probably only, because hemic murmurs are so frequent at the base of the heart, and there is nothing in the character of the murmur to lead to a positive assertion of the presence of aortic obstruction. The diagnosis in such a case has to be made not only by physical examination of the heart, but also by a consideration of the general appearance, the examination of the blood, the presence, absence or intensity of cardiac symptoms.

One point in regard to the loudness of murmurs is suggested to me by this case. In general terms it may be said that the serious character of a cardiac lesion cannot be told by the strength or weakness of a murmur. It is no unusual experience, for example, to have a patient brought to hospital with an entire absence of murmur, but with a feeble

and irregular pulse. After a few days' rest in bed, with the administration of cardiac stimulants and tonics a mitral or aortic murmur may seem to develop, although the heart is stronger and manifestly better. The cause of the appearance of the murmur is evidently the increased force of the cardiac contraction, which produces a murmur, where before it was absent exactly in the same way that a declivity causes an otherwise quiet stream to murmur. So little value have the presence or absence, strength or weakness of a murmur in estimating the physiological condition of the heart. So, also, the strength of the murmur can give us but little idea of the extent or character of the lesion present, as a loud, rasping, aortic obstructive murmur may be produced by a very stiff single leaflet at the aortic orifice if it be favorably placed, as well as by a marked stenosis from a welding together of all three leaflets. It is not safe to base a pathological diagnosis as to the extent of the lesion from the character of the murmur, inasmuch as on the autopsy table we frequently see extensive lesions that had caused but slight murmur during life, and, on the other hand, a comparatively trivial alteration from the normal, which, during life, had produced an extremely loud abnormal sound.

For some reason the murmur of mitral

obstruction has met with a colder reception than have other murmurs. Why this should be I personally do not understand, inasmuch as to my ear the mitral obstructive murmur is certainly as clearly heard as are the other murmurs, and I have frequently found that students heard this more readily than the ordinarily smooth, softer and less obtrusive murmur of mitral regurgitation. I imagine that there are two possible reasons for the scepticism in regard to this murmur that is even yet entertained by some. One of these I believe to be the lack of accord in regard to the nomenclature of the murmur. This question of nomenclature is at best but a poor subject for dispute, but it seems to me that the quibble over the question of naming the murmur "presystolic" or "diastolic" is nonsensical. It would be better to always speak of the murmur as that of mitral obstruction without dragging in the old bone of contention in regard to its name, which involves the time of its occurrence.

Barring the rare cases of aortic regurgitation with a murmur so heard, any murmur produced during ventricular diastole, and having its point of greatest intensity in the neighborhood of the apex, must denote some hindrance to the flow of blood from the left auricle into the left ventricle. The length of time dur-

ing which the murmur is heard may depend upon at least two factors—the degree of obstruction and the strength of auricular contraction.

A probably fruitful source of doubt in regard to the significance of the murmur under consideration is the fact that at times it is heard during life in cases which at autopsy present no trace of lesion of the mitral valve orifice or leaflets. This is the case in two by no means infrequent conditions—adherent pericardium and aortic regurgitation. To Flint is due the credit of calling attention to the presystolic murmur of pseudo-mitral obstruction in cases of aortic regurgitation. In this condition and in that of adherent pericardium we meet with the greatest degree of dilatation of the left ventricle, and the murmur of apparent mitral obstruction has been ingeniously explained by Phear in the *Lancet* for September 21, 1895, as due to the dilatation of the ventricular cavity and consequent stretching of the chordae tendineae. If the chordae are constantly tense it is fair to presume that during the auricular systole the two mitral leaflets cannot separate widely when the wave of blood is thrown from the auricle into the ventricle, but stand stiffly on either side of the current, and are consequently thrown into vibration, while the blood-stream itself is thrown into swirls by the

abnormal presence of the taut leaflets. For the presystolic apical murmur of adherent pericardium without mitral lesion this is the only evident explanation.

In regard to the presystolic apical murmur heard in cases of aortic regurgitation without mitral lesion another and seemingly plausible explanation is that which attributes the phenomenon to the forcing backward of the anterior mitral leaflet by the current of blood coming into the ventricle through the leaky aortic orifice. This would tend to approximate the two mitral leaflets, and as auricular systole occurs during the latter part of ventricular diastole, this displacement of the anterior mitral leaflet would tend to obstruct the flow of blood driven into the left ventricle through the channel so narrowed.

One of the most difficult lesions to detect positively during life, and one of the most frequent post-mortem surprises, is total obliteration of the pericardial cavity from a former pericarditis. A sign which was at one time much emphasized in making the diagnosis of this condition is systolic retraction of the intercostal space over the apex. This sign, which theoretically should be of value, has proven a slender reed, upon which we cannot rely on account of its frequent presence without the existence of peri-

cardial adhesions and its absence in the presence of this lesion.

Broadbent has described the occurrence of systolic retraction of the left or even right chest-wall posteriorly over the floating ribs. A sufficient number of cases have not as yet been collected to prove its constant presence in cases of adherent pericardium, but the finding of such retraction is a possibly valuable aid in diagnosis. The *pulsus paradoxus* and absence of diminution of the cardiac area of dullness or deep inspiration are important accessory signs of adherent pericardium, but require the presence of pleural synechiae or mediastinal inflammatory changes to ensure their occurrence.

Pericardial effusion can, as a rule, be readily determined if large in amount by the characteristic pear-shaped area of precordial dullness and by the apparent elevation of the apex-beat. Lesser amounts of fluid can be most readily detected by careful percussion of the angle formed by the lines of dullness of the right border of the heart and the upper surface of the liver. In pericardial effusion this angle becomes decidedly obtuse, even with but moderate exudation of serum. Rotch lays great stress upon the presence of absolute dullness in the fifth right interspace, and his experimental work with injection of cacao butter into the pericardium of the cadaver

confirms his view of the value of the sign.

With these few hints in regard to the physical examination of the heart itself it may be well to consider a few points in regard to certain extra-cardiac symptoms and signs of cardiac disease.

The pulse gives us valuable indications of the manner in which the heart is performing its work, yet in spite of the descriptions of the pulse in various cardiac conditions we have no pulse truly characteristic of any lesion save only the water-hammer, receding, or Corrigan pulse of aortic regurgitation. The pulse does, however, furnish valuable information not only as to the strength of the heart, but also, what is equally important, as to the relation existing between the heart's strength and the amount of peripheral resistance. What I mean can again best be shown by an illustration. A man may be seen suffering from intense precordial distress, with cold extremities and weak, fluttering heart action. Such a condition can be produced by too feeble a heart or by peripheral resistance inordinately increased, or by a combination of both conditions. Examination of the pulse will alone aid us in determining to which condition the patient's state is due and to which condition our measures must be adapted. If in such a case, as will be further men-

tioned under the discussion of various forms of treatment, we aim at the wrong portion of the circulatory apparatus, we may add to the patient's distress and possibly increase the difficulty to a dangerous or even fatal extent.

To determine the relation between heart force and peripheral resistance the pulse must not only be counted and the strength of the impulse-wave determined, but the tension of the pulse must be estimated by rolling the artery under the finger and by applying three fingers instead of one, in order to test the degree of force employed above and below the palpating finger that is necessary to obliterate the arterial wave and allow of collapse of the artery. It is much to be regretted that the sphygmograph has had to be relegated to the class of interesting scientific toys. So much depends upon the accuracy of adjustment and the regulation of pressure by the instrument that, while in some cases, a valuable graphic method of recording pulse conditions, it can by no means take the place of the fingers in giving information to the observer.

The slow pulse, aside from its general significance and its presence from the use of certain drugs, is chiefly of interest from the recognition of the peculiar association of paroxysmal bradycardia,

with certain nervous symptoms, such as vertigo, epileptiform attacks, etc.

The rapid pulse is of value in regard to the cardiac condition, chiefly because it is a numerical method of estimating the force and efficiency of the cardiac contractions, the weak heart having to contract more rapidly than does one of greater power in order to furnish the requisite amount of blood to the various portions of the body.

Aside from the rather rare congenital property of some hearts to intermit, intermission of the pulse, with irregularity in time and rhythm, is of value in giving us a guide for the estimation of the degree of degenerative changes in the myocardium.

The capillary pulse of Quincke, so frequently seen in aortic regurgitation, is observed not only in cases suffering from that lesion, but also in some cases of pernicious anemia, and, as in a case under my care in the Philadelphia Hospital during the past winter, in dilatation of the aortic arch (in the case mentioned the capillary pulse was more plainly seen by students than in a case of well-marked aortic regurgitation).

The dyspnea, which is so frequently the symptom that impels the sufferer from cardiac disease to seek medical advice, in certain rare cases is of such a character as to aid in diagnosis. The or-

dinary position assumed by the sufferer from cardiac dyspnea varies from that of slight elevation of the head and shoulders, when recumbent, to the picture so frequently seen and so distressing, where the patient cannot even recline against a bed-rest without serious exacerbation of the difficulty in breathing. In certain cases of pediculate polypi springing from the posterior wall of the left auricle the patient cannot sit up without immediate distress, on account of the fact that in the erect position of the trunk gravity causes the free extremity of the polyp to fall into the auriculo-ventricular orifice, thus obstructing communication between the two cavities of the left side of the heart as a ball-valve. A problem not always easy of solution is afforded by the frequent association of cardiac disease and anemia, both of which conditions give rise to dyspnea. It is only by the exercise of careful judgment and by painstaking investigation of associated signs and symptoms that we can avoid overmedication of the heart in cases wherein the condition of the blood is the cause of breathlessness.

The edema of cardiac disease is chiefly of interest from the insight that it gives us in regard to the propulsive power of the heart and of the arteriole walls, together with the various secondary factors in the proper maintenance of the pe-

ripheral circulation. Edema is frequently present with the existence of a fair radial pulse as estimated by the finger, yet, while edema of the feet persists, we may feel assured, in the absence of anemia and of renal disease, that the circulatory equilibrium is not fully restored.

The only other of the many cardiac symptoms to which I will refer is that of epistaxis. It is by no means an unusual experience at the Children's Hospital of Philadelphia for a little patient to be brought for treatment on account of frequent bleeding from the nose. This is so common a symptom of heart disease in children that complaint of it at once causes us to suspect that examination of the heart will reveal some morbid sign. In adults epistaxis is so common a symptom of early arterio-sclerosis that it is of value at times as a warning of the danger of the occurrence of this condition, prevention or amelioration of which can obviate the later occurrence of serious cardiac lesions.

One other point before leaving the question of diagnosis. Given a cardiac murmur, what means have we of estimating the pathological picture that may be shown at autopsy? If one tries to form a judgment as to this picture he will be probably doomed to many disappointments. It can be seen, therefore, that far more important than the, so to

speak, pathological diagnosis is the physiological diagnosis; in other words, it is not possible for us to estimate the extent or exact picture of the existing lesion, but it is possible for us to determine the seat of a cardiac lesion by the point of maximum intensity of the murmur, and by the time of the murmur to decide whether the lesion of the cardiac outlet is of an obstructive or regurgitant character. We can also, and for therapeutic purposes this is in reality of more importance, estimate from accompanying signs and symptoms the way in which the heart is doing its work and is overcoming the various hindrances to its proper action.

As in dealing with the question of diagnosis, so also with that of treatment our subject must be discussed in a fragmentary and suggestive manner rather than in a formal, systematic and orderly fashion. It can be said in regard to heart disease more than of any other class of ailments that needless medication is harmful drugging. One of the reasons why the whole class of cardiac diseases is of interest is because the effects of the trouble are so widespread and proper circulation is so dependent upon the due performance of all of the bodily functions that in handling our case we have to survey the whole field, stimulating here, checking there, regulating ingestion,

promoting excretion, etc., that one feels in grave cases that careful guiding is required to safely conduct our patient through the dangers that beset him. Pre-eminently can it be said of diseases of the heart that no symptom is too insignificant for notice, no measure of treatment too unimportant to be ignored.

In the matter of prevention but little need be said, as in many of our cases the onset of the trouble has long passed before we are called upon, and the preventive treatment in reality belongs to the subject of the treatment of the diseases likely to be complicated by or to produce cardiac disease. In two classes of cases we can use prophylactic measures—we can frequently control the endocarditis occurring in the course or as the result of rheumatism, scarlatina and various other constitutional diseases, and we can by withdrawing causes of prolonged high arterial tension lessen the liability to or postpone the occurrence of the sclerotic changes that precede the development of slow and serious disease of the aortic leaflets.

The treatment of cardiac disease is best divided into hygienic and medicinal, while these main divisions can both be subdivided into those directly connected with the functions of the heart and those indirectly aiding the heart by removing extraneous causes of cardiac embarrass-

ment or by increasing the working capacity of certain parts, in order to enable the heart to better perform its labors. In many cases of cardiac trouble, and this is probably more true of this than of any other class of organic diseases, the hygienic are of decidedly more importance than are medicinal measures. No general rules can be laid down for cases of heart disease, inasmuch as hardly any two cases agree in their signs and symptoms, and inasmuch as in an individual case the indications vary greatly at different times in the course of the case.

In handling a case of heart disease it is of prime importance to estimate the functional activity of every organ and system of the body, in order to correct any disorder that could interfere with the proper circulation of the blood. Here a difficulty is at once met in that in many cases it is well-nigh impossible to determine to what extent the abnormal performance of function is due to the cardiac disease and to what extent the intensity of the cardiac symptoms are dependent upon the extra-cardial disorder. In this class of cases we find exemplified to its fullest extent the formation of that bugbear of physicians, the vicious circle. For example, gastric indigestion is a frequent direct result of disorder of the circulation dependent upon cardiac disease. This gastric derangement increases the

heart trouble mechanically by distension of the stomach and, so to speak, vitally by failing to properly work up the ingesta and allowing the further chemical processes of digestion to be properly performed. So, too, the renal congestion of cardiac disease or the anatomical permanent interstitial changes resulting from long-continued renal congestion increases the retention within the body not only of fluids, but of excrementitious products, which react again upon the heart by depressing its force or by causing elevation of the arterial tension, and so increasing the work of that organ. The question then arises as to which member or members of the vicious circle should be first attacked. In the choice depends much of the failure or success of treatment. Fortunately we can frequently attack two or even three elements of the circle by the same measures.

Of prime importance in the treatment of heart lesions is the regulation of the life of the patient, so that it shall conform to the powers of the central organ of the circulation. A blacksmith, with serious heart disease, could with the same lesion attain many more years of life as a watchman; a sailor could prolong his existence for years if, in view of his cardiac lesion, he exchanged his laborious occupation for that of a sail-maker. In every case of cardiac disease

it is essential where possible to so regulate the life of the individual that the demand upon his heart shall not exceed the capacity of that organ.

The dietary for cardiacs can only be laid down in general terms, but the rule that the diet should be sufficient to maintain nutrition and, at the same time, be within the digestive power of the individual should be strictly enforced. Aside from this, we have no general rules that will be applicable. As a rule, the avoidance of excess of starchy foods will be required. An important point in the dietary of many cardiac cases is the regulation of the quantity of fluid ingested. While water and articles of diet containing much fluid are in many cases desirable adjuncts in treatment from the flushing of the tissues and consequent removal of waste products, we have to bear in mind the danger of edema from retention and extravasation of fluid. On the other hand, limitation of the amount of fluid ingested will often produce surprising results in the diminution of an existing cardiac dropsy. It is on this account that milk diet sometimes disagrees with cases of advanced cardiac disease. We have, therefore, to exercise careful judgment in regulating the amount of fluid ingested, avoiding on the one hand retention of waste products from lack of fluid, and, on the other, dropsy from the

taking of fluid in excess of the power of the excretory organs.

The habitual use of alcohol by cardiac cases is, as a rule, decidedly harmful, especially when it is taken in the form of malted beverages. The latter are detrimental from their mechanical distension of the stomach and from the fact that, taken in the usual large quantities, they cause overfullness of the blood-vessels and in many cases markedly increase the work of the heart. In cases of cardiac degeneration, with dilatation, this statement holds with greatest force. In addition, we must bear in mind that alcohol taken as a beverage may needlessly and constantly whip up the diseased heart, causing it to do more work than is necessary and leaving it in worse case than if it had been allowed to do its work in a quiet manner.

The regulation of the amount of exercise desirable or permissible is an important part of the duty of a physician in handling a case of heart disease, and is a question that needs careful study. It is in general a safe rule to allow the patient to take exercise in amount sufficient to keep well within the bounds of shortness of breath. The amount of exercise to be allowed varies from none at all through the grades of massage and passive movements, resisted movements, exercise with no, or but very light, apparatus, up

to the more ordinary methods of making exertion. In hearts with active inflammatory changes going on within its cavities absolute rest is needed to diminish the work of the heart to within the smallest possible limits on the same principle that quietude is required by any other inflamed portion of the body where activity does not avail to remove the cause or results of the inflammation; and rest in this condition is important for a second reason, namely, the prevention of detachment of emboli from the inflamed endocardial surfaces, an accident that is much favored by any sudden increase of cardiac activity. Rest is also required in some cases at the other end of the series of cardiac disability, when compensation has become lost and when the enfeebled heart can effect but little more than its own evacuation and the maintenance of life in other equally important parts of the body.

In the periods between these two extremes exercise is a remedial measure of no mean importance. A glance at the effects of exercise as it bears upon the question before us may be of interest. To those who have not already read a most suggestive article by T. Lauder Brunton in the *Lancet* of October 12, 1895, upon the treatment of atheroma, the writer would earnestly recommend its perusal. In dealing with the mode of ac-

tion of massage in its effects upon atheroma the author referred to has most clearly outlined the reason for the beneficial effects of not only massage, but also exercise in atheroma, and his remarks might with equal propriety be applied to their use in heart disease. In this connection the point previously mentioned, in regard to the circulatory apparatus being viewed as a continuous whole and not as consisting of a contracting heart and conducting blood-vessels, is of importance. By massage as by exercise (which can be looked upon as, in a sense, voluntary massage) the interstitial lymphatic circulation is accelerated, the venous blood is forced out of the parts in operation, the arterial blood is in consequence injected with greater freedom, and we have, so to speak, a local stimulation of each acting part, with (especially in the case of massage) no corresponding increase in the work of the central organ of propulsion. Such a local acceleration of the blood current occurring successively or simultaneously in various portions of the circulatory area cannot fail to be of benefit to the whole circulatory apparatus, especially in the case of the chief, and therefore most aided, propelling portion thereof. Where the heart has power insufficient to allow of general exercise, local or partial exercise, as by resisted movements,

may be employed, or, in cases where the cardiac force is insufficient to allow of even this form of exercise, massage may be permissible, on account of its requiring no muscular effort or increase of cardio-pulmonary action.

Cases are met with where even the slight increase of cardiac action produced by massage cannot be borne. Such cases are, however, not frequent. It may be said, therefore, that exercise (including massage) is of great advantage in many cases of heart disease, and that the limit to which this can be carried varies with each case, and must be laid down so that at no time will the exercise produce palpitation, dyspnea or other sign of cardiac distress. The plan of exercise advocated and systematized by Oertel, by climbing ascents of increasing length and severity, has much to recommend it, especially in cases of disease of the myocardium, where the squeezing out of waste products from and increase of interstitial circulation in the heart-wall will be of benefit if we keep well within the limits of the capacity of the heart. Among the many varieties of exercise that can be indulged in within the limitations above mentioned might be especially named rubbing of the surface more or less vigorously once or twice daily with a flesh-brush or Turkish towel, which equalizes the circulation and tends

to prevent the occurrence of visceral congestions; contortion movements of the trunk and extremities; muscular exercise with wands or light wooden dumb-bells; horticulture; light carpentering and other forms of light exercise more in the form of ordinary modes of muscular action.

The systematic employment of baths and exercises according to the method systematized by the brothers Schott has been now thoroughly tested and proven worthy of confidence and of very great benefit by a very large number of observers. It is undoubtedly a distinct addition to our means for treating heart disease.

The question of ordinary bathing is one of importance. The physician will need to employ as much judgment in regulating the bath as in prescribing exercise. In but few subjects of heart trouble is the cold bath desirable. Where compensation is assuredly perfect, where there is good reason to believe that the myocardium has not undergone degenerative changes, and where the lesion is presumably of slight extent, the cold bath may be permitted, save in regurgitant lesions at the pulmonary or aortic orifice. This statement I believe to be true, but I would point out that certainty in regard to the presence of the conditions named can but rarely be asserted.

Baths are essential to the cardiac, but they are best taken warm or tepid, at intervals of not less than forty-eight or seventy-two hours, and should not be prolonged beyond the requirements of cleanliness.

The saline and effervescing baths employed in the Schott method of treatment have received sufficient endorsement to stamp them as decidedly valuable, but they require more attention than can usually be devoted to the bath, and, moreover, owe at least a considerable part of their value to their use in combination with other methods employed in this systematized plan of treatment. An occasional hot-air bath, carefully given, in selected cases, with subsequent friction with alcohol, is at times productive of much benefit to the circulation. This is particularly true for cases of aortic obstruction, combined with and dependent upon sclerotic changes in the vessels and fibrosis of various organs.

The clothing of the sufferer from heart disease is to be regulated so as to prevent the occurrence of sudden or prolonged chilling of the surface. In aortic disease this is chiefly because of the risk attending sudden contraction of the peripheral arterioles, a risk most extreme in cases of aortic regurgitation, while in mitral disease it is of great importance, especially because of the danger of internal

congestions, as, for example, in the pulmonary circuit. To meet this danger woolen underclothing of weights varying with the external temperature is the best provision.

Leaving the question of hygienic measures, treatment of heart disease by drugs requires mention.

The subject of the medicinal treatment of heart disease is one that bears subdivision poorly, inasmuch as it is difficult to separate into groups the remedies employed, and, in the second place, to dogmatically assert in exactly what classes of cases the various drugs will be of value. Of the many medicines that have been employed as cardiac stimulants and tonics I shall mention but a few and only those which have definitely proven their claims to favor. Before taking up the agents that we employ for their direct action upon the organs of circulation a few words may be said in regard to certain remedies which indirectly aid the heart and some of which have been at times ranked almost with the various cardiac remedies.

Calomel, which has been much used in cases of heart disease, is a drug of very great value when properly employed. Its cholagogue action is of immense benefit, its laxative properties are often useful, its supposed diuretic action is frequently of value, while its absorbifacient action

is no mean factor in the treatment of heart cases. My own habit is to employ it at frequent intervals in the course of many cardiac cases, especially in the form of a Saturday-night pill composed of pulv. ipecac, gr. ss.; calomel, gr. i, or, substitute blue mass, gr. ii for the calomel. This combination so given stimulates the hepatic functions, ensures the occasional exit of a free flow of bile and possibly has a more general action upon lymphatic activity than is usually granted. Calomel also does good by its laxative action in sweeping out of the bowel materials (ptomaines) which could be absorbed and act as direct cardiac depressants. Saline laxatives produce the same result, but, in addition, are of great value in cases of dropsy, owing to the free watery evacuations which they produce.

Potassium iodide has a markedly favorable influence in many cases. It is possible, although to my mind hardly probable, that its absorbifacient power may have same direct influence upon the extent of the sclerotic changes in the sub-endocardial tissue. Its favorable action can with more certainty be attributed to its power of lowering arterial tension, a property doubtless chiefly due to its power of increasing the elimination of waste products, retention of which with-

in the system is so potent a factor in causing high arterial tension.

Citrate of lithium, although but seldom mentioned in connection with diseases of the heart, is an extremely active aid, especially in cases having a tendency to high arterial tension, and even more markedly in cases associated with scanty excretion of urine.

Ergot is a valuable remedy in certain cases where overaction and cardiac distress are due to the fact that the arterioles are lacking in tone and wherein the heart misses the steady-ing influence undoubtedly exerted by a well-regulated vaso-motor nervous system. It will be found, however, that in this class of cases a combination of bromide of ammonium with belladonna will be productive of better results, except for the fact that the accelerator action of belladonna upon the heart will at times be somewhat too marked.

Morphia is at times a most useful drug in cases of heart disease, seeming in small dose to act as a veritable cardiac tonic and sedative of no mean value. In what manner it acts is not precisely known, but that it does aid the heart in performing its labors in some cases is an undoubted clinical fact.

Of the remedies acting more directly upon the heart there are two sedative drugs that are at times of use—aconite

and veratrum viride. Of these the first will often prove of service where there is tumultuous cardiac action not dependent upon muscular weakness in the wall of the organ or upon excessive peripheral resistance. In these cases it seems as though the nervous excitation was furnished beyond the requirements of the circulation. Here tincture ofaconite in doses of one minim every hour or two will frequently rapidly remove the cause of distress. Where the same condition is associated with high arterial tension veratrum viride will at times act happily, but the same effect will usually be better accomplished by the use of nitroglycerine or the nitrites.

One of the best pure cardiac sedatives that we possess is external cold applied in the form of an ice-cap or Leiter's coil to the precordium.

In classifying the drugs which seem to have a tonic action upon the heart it is again somewhat difficult to determine clinically to exactly what property they owe their action, whether by their direct action upon the heart or indirectly by relieving some cause of cardiac embarrassment. Of this class of drugs digitalis holds pre-eminently a high place, and yet it is undoubted that, while a drug potent for good, it can, if not perfectly suitable, give rise to nothing but evil effects. The great value of digitalis in

certain cases has doubtless led to its being greatly misused, and it is a question to be always gravely considered whether in a given case of heart disease its action will be beneficial or the reverse. The broad statement that digitalis does good in mitral disease and harm in lesions of the aortic orifice is only a fair working guide, inasmuch as in many cases of mitral disease it increases the cardiac embarrassment, while in certain cases of disease at the aortic orifice it can, if judiciously employed, be of decided benefit.

It seems to me that the best general rule for its employment could be formulated somewhat in this way: If the circulatory trouble arises from the condition of the heart muscle alone digitalis will usually do good; if the trouble arises from the work imposed upon the heart being too great, although the muscular walls are in fair condition, it is apt to do harm, or, at least, will not do good; if the trouble arises from a degenerated or relatively weak heart muscle, with an increase in the amount of work required of the organ, it may do good, but in such cases it usually requires the addition of some other agent to counteract its peripheral effects. Digitalis is an excellent cardiac tonic, because by its stimulating action upon the pneumogastrics it slows the heart and thereby prolongs its brief periods of rest, and because it increases

the force of contraction and thereby enables the organ to not only empty its cavities thoroughly, but also to squeeze out of its own interstices the contents of its lymphatic channels and veins. It is capable of doing harm by causing hyper-systole in a heart already contracting sufficiently forcibly to overcome the existing peripheral resistance, while by its vaso-constrictor action it adds more opposition to the effective working of the organ. It is on account of this vaso-constrictor action that the remedy is of less value in aortic than in mitral disease, inasmuch as in aortic obstruction slight increase in the existing obstacle to the free outflow of arterial blood will be sufficient to seriously embarrass the heart, while in aortic regurgitation the increase in arteriolar contraction will raise arterial tension and produce a greater back flow of blood from the aorta into the left ventricle during the prolonged diastole. In mitral disease peripheral resistance is a factor of less importance, and the strengthening of the cardiac muscle is the important object, while in the case of mitral obstruction the lengthened diastolic period allows of a larger mass of blood reaching the left ventricle through the narrowed mitral orifice.

The combination of calomel, squill and digitalis, of each a grain, cannot be too highly praised in connection with cases

of advanced mitral disease with anasarca. Its action is often most happy, far better than that obtained by the use of the various constituents alone, and oftentimes after a few doses the heart's action becomes quiet and strong, the pulse becomes full and steady, the anasarca lessens, the urinary flow increases, the bowels move, and, what is of more moment to the patient, the distressing dyspnea vanishes. The effect is probably produced by a combination of the power of digitalis as a cardiac tonic, vaso-motor constrictor and diuretic, of squill as a diuretic, and of calomel as a cholagogue and laxative.

Strophanthus is somewhat like digitalis in its action, but has the advantage over it that it has less action as a vaso-constrictor. While this is a decided advantage in some cases, it is of distinct detriment in cases, and they are by no means few, where the vaso-constrictor action is a decided help in the steadyng of the circulation. In the cases occasionally encountered wherein digitalis cannot be taken from idiosyncrasy, strophanthus can usually be well borne.

Sparteine is chiefly of importance from its diuretic action, and its use in cases attended by scanty excretion of urine is at times most happy. The same can be said of caffeine, which has the additional advantage of being a good res-

piratory stimulant. It is a rather curious fact that where sparteine fails as a diuretic caffeine will usually increase the amount of urine and *vice versa*.

Strychnia is a cardiac and vascular tonic of great value, and is also the best general stimulant, one of the best respiratory stimulants and one of the best stomachics that we possess. Its value in the weak heart following influenza is well recognized, but it seems to me that in disease of the aortic valve its action is equally happy.

Nitroglycerine is a remedy of the greatest value in cardiac and vascular disease. Its vaso-dilator action, by which it opens up the arteriolar paths and permits a free passage of blood from heart to capillaries, makes it a drug of much importance and utility, especially in combination with strychnia in the treatment of either form of disease of the aortic orifice. Its vaso-dilator action is especially manifested in such conditions as angina pectoris, where the quickest way of affording relief is by expanding the arterial tree and so allowing the distended ventricle to empty itself with freedom. The results of treatment of aortic disease with increased arterial tension by iodide of potassium in doses of five grains three times daily, with a pill of sulphate of strychnia, gr. 1-40, and nitroglycerine, gr. 1-100, every four hours, are most gratifying,

while if massage can be added the effects of the course of treatment are sometimes astonishing. In using nitroglycerine it is important to remember that its action is quite transitory, and that failure in obtaining benefit from it is sometimes due to the infrequency of its administration.

I have said nothing in regard to ammonia and alcohol, because, while they are both of marked value as temporary stimulants of cardiac action, they are of but relatively little value save in combating sudden cardiac failure and in tiding over a period of marked temporary cardiac enfeeblement. I have also neglected to mention many of the cardiac tonics, such as convallaria, cactus and a variety of others, because I have never been able to see that they possessed decided advantages over those that I have mentioned, and their consideration would have unduly lengthened this already long paper.

Of one other remedy I would speak—of venesection. In some distressing cases of mitral disease the patient presents the following picture: Sitting up in bed or in a chair, leaning forward, the patient gasps for breath, moving the head uneasily about in his effort to get more air, the face having a bloated appearance, the lips of a livid, mottled or rather purplish color, the superficial veins distended, the pulse at the wrist feeble and

irregular or imperceptible, the heart-sounds confused and irregular. In such a case as this the letting of blood from the arm in quantities varying from ten to thirty ounces will at times change the whole picture. I have seen such cases brought to hospital practically moribund and have seen them again twenty-four hours after the bleeding lying quietly in bed with a fairly good color, with quiet, deep respirations and a quite deliberate, steady heart and pulse of good force and volume. The feeble pulse is no contraindication to bleeding in such cases, as it is not produced in the same way as is the feeble pulse after hemorrhage. The arterial pulse is poor because the blood is accumulated in the right side of the heart and in the left auricle, distending the veins, overloading the right auricle and ventricle, filling the blood-vessels of the lungs and distending the left auricle. It has been objected to a large mass of clinical proof of the value of venesection in this condition that we cannot empty the heart by bleeding from a vein, as the column of blood could not pass backward through the valves in the veins. But, unless the heart has stopped working, we can by bleeding, and thus diminishing the amount of blood in the venous system, lessen the supply of blood going to the heart and so virtually allow it to the better empty itself, while the

removal of blood from the vein allows of the more ready passage of arterial blood through the capillaries. However, the proof of the pudding is in the eating, and had I seen such relief in but one case that case alone would compel scepticism on my part in regard to all of the theoretical arguments against the procedure.

I cannot better close this fragmentary paper than by quoting a sentence from an article by Beverly Robinson in the *American Journal of the Medical Sciences* for December, 1894. With his statement I heartily agree. It is as follows: "In administering drugs we must recognize, however, that we use them for the purpose of relieving symptoms or diminishing the complicating conditions, not to cure chronic valvular disease; once the latter is well established it is there to remain, and our effort should be, not to cure, but to prevent it from becoming really injurious by reason of its possible effects."



